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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,903	03/19/2004	Michael Keat Lye Lee	111079-134717	8363

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EXAMINER

NGO, HUNG V

ART UNIT	PAPER NUMBER
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2831

MAIL DATE	DELIVERY MODE
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06/26/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/804,903

Applicant(s)

LEE ET AL.

Examiner

Hung V. Ngo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 11-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 16-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of group I, claims 1-10, 16-28 in the reply filed on 04-12-07 is acknowledged.

### ***Claim Objections***

Claims 6, 24 are objected to because of the following informalities: "cold form thermal interface material" is not clearly understood because the applicant did not identify the materials used for this purpose. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al (US 6,794,223).

Re claim 1, Ma et al disclose an apparatus, comprising:

a die carrier (310);

a heat spreader lid (320) mounted on the die carrier to form a lid cavity (Fig 7);

an integrated circuit die (330) mounted on the die carrier and within the lid

cavity; and

a cured mold compound (340) disposed to fill the lid cavity and to at least partially surround the IC die (Fig 7).

Re claim 2, wherein the heat spreader lid has a dispensing hole (322) formed therein to facilitate injection of a mold compound solution into the lid cavity and an air outlet hole (324) formed therein to allow air to escape from the lid cavity.

Re claim 3, wherein heat spreader lid is made of metal (col. 4, line 45).

Re claim 4, wherein the heat spreader lid includes a thermal interface material (225) interposed in thermal conducting relationship between the heat spreader lid and the die.

Re claim 5, wherein the thermal interface material is coaxially aligned with the die and includes a width and a length dimension which are substantially the same as a corresponding width and a corresponding length dimension of the die (Fig 6).

Re claim 6, wherein the thermal interface material comprises a cold form thermal interface material (col. 3, lines 24-27).

Re claim 7, wherein the die includes a first surface, a second surface and a plurality of lateral sides extending between the first and second surfaces; the first surface includes a plurality of electrical contacts (350) coupled to the die carrier; the second surface is disposed in an abutting relationship with the thermal interface material; and the mold compound extends between the heat spreader lid and the die carrier and surrounds the lateral sides and the first surface of the die (Fig 7).

Re claim 8, wherein the die is mounted to the die carrier by a flip-chip mounting (Fig 7).

Re claim 9, wherein the flip-chip mounting includes a plurality of solder bumps (350) coupling the die to the die carrier.

Re claim 10, wherein the mold compound is a polymeric material (col. 5, lines 35-50).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al in view of Low et al (US 6,404,626).

Re claim 16, Ma et al disclose a system, comprising:  
an integrated circuit (IC) package including a die carrier (310); a heat spreader lid (320) mounted on the die carrier to form a lid cavity; an IC die (330) mounted on the die carrier and within the lid cavity; and a cured mold compound (340) disposed to fill the lid cavity and to partially surround the IC die;

Re claim 17, wherein the IC die is a microprocessor (col. 3, line 62).

Re claim 20, wherein the heat spreader lid has a dispensing hole (322) formed therein to facilitate injection of a mold compound solution into the lid cavity and an air outlet hole (324) formed therein to allow air to escape from the lid cavity.

Re claim 21, wherein heat spreader lid is made of metal (col. 4, line 45).

Re claim 22, wherein the heat spreader lid includes a thermal interface material (225) interposed in thermal conducting relationship between the heat spreader lid and the die.

Re claim 23, wherein the thermal interface material is coaxially aligned with the die and includes a width and a length dimension which are substantially the same as a corresponding width and a corresponding length dimension of the die (Fig 6).

Re claim 24, wherein the thermal interface material comprises a cold form thermal interface material (col. 3, lines 24-27).

Re claim 25, wherein the die includes a first surface, a second surface and a plurality of lateral sides extending between the first and second surfaces; the first surface includes a plurality of electrical contacts (350) coupled to the die carrier; the second surface is disposed in an abutting relationship with the thermal interface material; and the mold compound extends between the heat spreader lid and the die carrier and surrounds the lateral sides and the first surface of the die (Fig 7).

Re claim 26, wherein the die is mounted to the die carrier by a flip-chip mounting (Fig 7).

Re claim 27, wherein the flip-chip mounting includes a plurality of solder bumps (350) coupling the die to the die carrier.

Re claim 28, wherein the mold compound is a polymeric material (col. 5, lines 35-50).

The teaching as discussed above does not disclose a circuit board or mother board having mounted thereon the IC package; a dynamic random access memory

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coupled to the IC package; and an input/output interface coupled to the IC package (re claims 16, 17), wherein the input/output interface comprises a networking interface (re claim 18), wherein the system is a selected one of a set-top box, an entertainment unit and a DVD player (re claim 19).

Re claims 16-19, Low et al disclose a circuit board or mother board (100) having mounted thereon the IC package (CPU 102); a dynamic random access memory (106) coupled to the IC package; and an input/output interface (27) coupled to the IC package, wherein the input/output interface comprises a networking interface (75), wherein the system is a selected one of a set-top box, an entertainment unit and a DVD player (Fig 1a)(re claim 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the circuit board or mother board having mounted thereon the IC package, the dynamic random access memory coupled to the IC package; and the input/output interface or networking interface coupled to the IC package, the set-top box with the structure of Ma et al for the purpose of forming a personal computer

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung V. Ngo whose telephone number is (571) 272-1979. The examiner can normally be reached on Monday to Thursday 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean A. Reichard can be reached on (571) 272-2800 EXT 31. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

06-12-07  
HVN

Hung V Ngo

**HUNG V. NGO  
PRIMARY EXAMINER**